Remarks

Non-Compliant Amendment

In response to the Notice of Non-Compliant Amendment (37 CFR 1.121) mailed on January 8, 2004 in the above Request for Continued Examination, Applicants have presented compliant Amendments and Remarks.

Claim Objections

The Applicants thank the Examiner for pointing out the over sight in the Claim numbering.

Claim Rejections – 35 USC § 112

Claims 1 – 17 and 19 – 21 stand rejected under 35 U.S.C. § 112, second paragraph as being indefinite for failing to particularly point out and distinctly Claim the subject matter which the applicant regards as the invention.

In particular, the Examiner asserts that the term "set" is indefinite because the numerical value of "set" is unclear.

In Claims 1 – 17 and 19 – 21, the phrases "set" or "set of" have been replaced with the phrase "at least one."

Claim Rejections – 35 USC § 103

Claims 1 – 10 and 12 – 17 and 19 – 21 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Schmitz et al. ("MOVPE growth of InGaN on sapphire using growth initiation cycles" Materials Science & Engineering B, 1997) in view of Burmeister (US 3,617,371).

Amended Claim 1 includes the recitation "controlling at least one process temperature and the temporal variation thereof in correspondence with a numerically simulated temperature variation profile."

Schmitz et al. discloses that an inductive heater brings a susceptor to a maximum temperature of 1600 degrees C and that due to the small thermal mass of the susceptor, very fast heat-up and cooling cycles up to 6 degrees per second can be achieved. (*Col. 2 – 3*). Furthermore Schmitz reveals that growth temperatures are adjusted with a preceision of 0.1 degree C at the required value between 450 and 1050 degrees C. Precise temperature control of a quartz ceiling inside a reactor is employed to keep only a remaining inner reactor wall at a suitable elevated temperature (700 – 950 degrees C). (*Col. 4 – 5*).

However, Schmitz et al ("MOVPE growth of InGaN on sapphire using growth initiation cycles" Materials Science & Engineering B, 1997) fails to teach or even suggest "controlling at least one process temperature and the temporal variation thereof in correspondence with a numerically simulated temperature variation profile" as required by amended Claim 1.

Burmeister (U.S. Patent 3,617,371) discloses a vertical reactor which includes separately arranged source, mixing and growing chambers which may be selectively heated inductively to eliminate contaminating decomposition of the reactor walls. (*Col. 1, l. 25 – 28*). Cylindrical walls enclose the chambers and comprise an electrically conductive refractory material such as graphite. These conductive walls are electromagnetically coupled to RF heating coils which in turn are coupled to a source of RF power. An upper portion adjacent the source chamber operates at approximately 850 degrees C, a portion adjacent the mixing chamber operates at approximately 800 degrees C and a lower portion adjacent

the growing chamber operates at approximately 750 degrees C. (*Col. 2, l. 30 – 54*).

However, Burmeister (U.S. Patent 3,617,371) also fails to teach or even suggest "controlling at least one process temperature and the temporal variation thereof in correspondence with a numerically simulated temperature variation profile" as required by amended Claim 1.

Thus, Schmitz et al. and Burmeister fail to teach or even suggest, either alone or in combination, all elements of Claim 1, namely "controlling at least one process temperature and the temporal variation thereof in correspondence with a numerically simulated temperature variation profile."

Therefore, the Applicants respectfully submit that Claim 1 as amended is clearly patentable over Schmitz et al. in view of Burmeister and stands in condition for allowance. Amended Claims 2 – 10 and 12 – 17, which depend variously from Claim 1 are therefore also patentable for at least the same reasons as set forth with respect to Claim 1.

Claim 11 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Schmitz et al. ("MOVPE growth of InGaN on sapphire using growth initiation cycles" Materials Science & Engineering B, 1997) in view of Burmeister (US 3,617,371) as applied to Claims 1 – 10 and 12 – 17 above, and further in view of Takai et al. (US 5,402,748).

Takai et al. discloses the temperature profile for the process of growing a GaAs layer used for carrying a semiconductor device on a substrate for a GaAs layer on a GaAs substrate and a GaAs layer on a Si substrate. (*Col. 3, l. 29 – 35*). Takai et al also discloses baking a Si substrate in a reaction chamber at 1000

degrees C for 10 minutes while flowing H_2 and AsH_3 under a total pressure of 76 Torr. (*Col. 4, l. 37 – 39*).

However, Takai et al. (US 5,402,748) also fails to teach or even suggest "controlling at least one process temperature and the temporal variation thereof in correspondence with a numerically simulated temperature variation profile" as required by amended Claim 1.

Thus, Schmitz et al., Burmeister and Takai et al. fail to teach or even suggest, either alone or in combination, all elements of Claim 1, namely "controlling at least one process temperature and the temporal variation thereof in correspondence with a numerically simulated temperature variation profile."

Therefore, the Applicants respectfully submit that Claim 1 as amended is clearly patentable over Schmitz et al. in view of Burmeister and further in view of Takai et al. and stands in condition for allowance. Claim 11, which depends from Claim 1 is therefore also patentable for at least the same reasons as set forth with respect to Claim 1. New Claim 22, which depends from Claim 1 is therefore also patentable for at least the same reasons as set forth with respect to Claim 1.

Furthermore, Applicants submit that new Claim 23, and claims depending therefrom, are patentable because the prior fails to disclose controlling at least one process temperature and the temporal variation thereof in correspondence with a numerically simulated temperature variation profile, wherein the at least one process temperature comprises the temperature of the gas inlet, T_1, the temperature of the chamber walls, T_2, the temperature of the first wafer support, T_3, the temperature of the second wafer support, T_4, the temperature of the gas outlet, T_5, the temperature of the gas mixing system, T_6, the temperature of the

upper side of the reaction chamber, T_7, and the temperature of the heating system, T_8.

Furthermore, Applicants submit that new Claim 29, and claims depending therefrom, are patentable because the prior fails to disclose controlling each of the temperature of the gas inlet, T_1, the temperature of the chamber walls, T_2, the temperature of the first wafer support, T_3, the temperature of the second wafer support, T_4, the temperature of the gas outlet, T_5, the temperature of the gas mixing system, T_6, the temperature of the upper side of the reaction chamber, T_7, and the temperature of the heating system, T_8 and the temporal variation thereof in correspondence with numerically simulated temperature variation profiles.

Furthermore, Applicants submit that new Claim 30, and claims depending therefrom, are patentable because the prior fails to disclose controlling at least one process temperature and the temporal variation thereof in correspondence with a temperature variation profile, wherein the at least one process temperature comprises the temperature of the gas inlet, T_1, or the temperature of the chamber walls, T_2, or the temperature of the first wafer support, T_3, or the temperature of the second wafer support, T_4.

Respectfully submitted,

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